

**Additional file 1. Summary of details of studies aimed at evaluating the American Joint Committee on Cancer (AJCC) 8<sup>th</sup> edition breast cancer prognostic staging.**

Study	Cohort	Years	N	Discordance prognostic vs anatomic stage*	HER2+ N	HER2+ treated with trastuzumab (%)	HER2+: Discordance prognostic vs anatomic stage*	HER2+: performance of prognostic stage
Weiss A, JAMA Oncol 2017 <sup>1</sup>	MD Anderson (MD) & California Cancer Registry (CCR) Retrospective	2007-2013 (MD) 2005-2009 (CCR)	3327 (MD) 54727 (CCR)	57.6% (MD), 51.6% (CCR) Down: 29.5% (MD), 31.0% (CCR) Up: 28.1% (MD), 20.6% (CCR)	306 (MD) 9676 (CCR)	Not reported	Not reported	Not reported
Plichta J, Annals Surg 2018 <sup>2</sup>	National Cancer Database Retrospective**	2010-2014	493854	36.6% Down: 29.7% Up: 6.8%	60155	Not reported	29.4% Down: 29.4% Up: 0%	Not reported
Abdel-Rahman O, Breast Cancer Res Treat 2018 <sup>3</sup>	SEER-18 registry Retrospective**	2010-2014	209304	Not reported	25347	Not reported	Not reported	Not reported
Shao N, Cancer Manag Res 2019 <sup>4</sup>	SEER-18 registry Retrospective**	2010-2014	168076	53.2% Down: 22.1% Up: 31.1%	25446	Not reported	Not reported	Not reported
Kim I, J Breast Cancer 2018 <sup>5</sup>	Korean Breast Cancer Society Retrospective	2009-2012	49248	45.8% Down: 26.1% Up: 19.4%	4964	N=4342 received target therapy	Not reported	Not reported
Liu Y-Y, Future Oncol 2019 <sup>6</sup>	SEER database Retrospective**	2010-2014	19608 all triple negative	Not reported in detail	0	-	-	-
Wang M, The Breast 2018 <sup>7</sup>	SEER-18 registry Retrospective**	2010-2013	10053 all locally advanced	74% Down: 33% Up: (41%)	2576	Not reported	69% Down: 35.1% Up: 33.9%	Not reported
Lee SB, Breast Cancer Res Treat 2018 <sup>8</sup>	Asan Medical Center Retrospective	1999-2008	7458	Not reported	1982	0%	Not reported	Not reported
Wong RX, The Breast 2018 <sup>9</sup>	SingHealth institutions Retrospective	2006-2014	6287	46.5% Down: 40.7% Up: 5.8%	1497	86% of 1116 HER2+ patients treated with chemotherapy	Not reported	Not reported

Kurundkar A, Clin Breast Cancer 2018 <sup>10</sup>	The University of Alabama at Birmingham Retrospective	1998-2013	6050	52.4% Down: 24.7% Up: 27.7%	561	Not reported	Not reported	Not reported
Kim J-Y, Breast Cancer Res Treat 2018 <sup>11</sup>	Samsung Medical Center Retrospective	2004-2008	2790	58.1% Down: 23.4% Up: 34.7%	562	Mostly untreated with trastuzumab	Not reported	DSS log-rank p 0.014 (HR+/HER2+, n=260) and p<0.001 (HR-/HER2+).
Savage P, Eur J Surg Oncol 2019 <sup>12</sup>	McGill University Health Centre Retrospective	2010-2013	1703	46.2% Down: 7.5% Up: 38.8%	259	Not reported	Not reported	Not reported
Hu H, World J Oncol 2017 <sup>13</sup>	Peking University Shenzhen Hospital Retrospective	2011-2016	784	45.7% Down: 27.9% Up: 17.7%	238	Not reported	Not reported	Not reported
Jang N, Virchows Archiv 2019 <sup>14</sup>	Yeungnam University Hospital Retrospective	2005-2007	714	45.5% Down: 35.6% Up: 9.9%	129	0%	30.2% Down: 30.2% Up: 0%	Not reported
Ye J, Chin J Cancer Res 2017 <sup>15</sup>	Peking University First Hospital Retrospective	2008-2014	421 all Luminal A	41.6% Down: 40.2% Up: 1.4%	0	-	-	-
Zhou B, Anticancer Res 2017 <sup>16</sup>	Peking University First Hospital Retrospective	2008-2014	170 all HER2 enriched	-	170	44%	68.8% All upstaged except 1 patient	OS log-rank p<0.001 for anatomic and prognostic stage

Abbreviations: N, number; OS, overall survival; DSS, disease specific-survival; HR, hormone receptor

\*Down: assigned to a more favorable stage by prognostic stage vs anatomic stage (i.e. prognostic stage IA and anatomic stage IB)

Up: assigned to a less favorable stage by prognostic stage vs anatomic stage (i.e. prognostic stage IIA and anatomic stage IB)

\*\*Studies using the National Cancer Database or the SEER registry over a period of time including years 2010-2011. These studies used data partially overlapping with those used by the AJCC panel to develop the prognostic stage.

## References

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